DRAFT – does not represent DEP position

January 10, 2008

To: David Littell, Commissioner

From: Andrew Fisk, Bureau Director, Land & Water Quality

Re: DEP standards on noise and shadow flicker at windpower projects

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Noise standards

The Department has extensive experience with its noise regulations (06-096 CMR, Chapter 375) which are administered under the provisions of the Site Location of Development Act. These rules have been in place since 1979 and have been applied to hundreds of different types of projects around the state. These rules were developed to consider a wide range of activities that generate different types of noise in different settings. The rules were consciously designed to consider many different types of developments, rather than be particular to any one type of noise or development. That said, there are rules and ordinances that have been developed for particular types of projects, including wind power projects.

Following the issuance of the Site Location permit for the Mars Hill windpower project, which required the submission of detailed predevelopment wind studies, the Department worked with the owners of the facility to scope and then review a post-development noise study. This monitoring work began in spring 2007 and is continuing through the winter of 2008. The results of this ongoing assessment of the noise generated by the project have been reviewed by the Department as well as a consultant hired by the Department to peer review the work of the applicant's consultant.

As a result of the consultant's assessment of other existing noise rules developed for windpower projects; the Department's experience with its own noise regulations; and the peer review of both pre- and post-development noise studies at the Mars Hill site, the Department has developed a number of specific conclusions and recommendations regarding the applicability of the noise rules to wind power projects.

Shadow flicker

There has been some comment provided to the Department that wind turbines have caused impacts on private residences from shadow flicker when sun shines behind an operating turbine. Maine's northern latitude may make wind power projects susceptible to causing irritating shadow flicker as a result of low altitude sun during certain times of year. Shadow flicker is described as "moving shadow on the ground resulting in alternating changes in light intensity" and has been noted to cause concern in Northern Europe (NRC 2007). The NRC report notes that there is available modeling software that allows for shadow flicker to be assessed and mitigated in the layout and design of windpower projects that are near developed areas.

Conclusions & recommendations

- Except for one clarifying change outlined below, the existing statute and rules are sufficient to allow the Department to regulate the noise effects of wind power turbines. DEP's noise rules conform with the stated best practices of the National Research Council's 2007 report on the "Environmental Impacts of Wind-Energy Projects."
- Revise Chapter 375.10 (E) to provide the Commissioner with the authority to "establish any reasonable requirement to ensure that the developer has made adequate provision for the control of noise . . ." Present language limits that authority to the Board of Environmental Protection (BEP) only.
- Noise generated from wind turbines does have attributes that warrant particular focus in the review of projects, including the low-frequency modulating noises generated as turbine blades pass by towers.
- Analysis of ambient noise generated by wind must be carefully evaluated with specific equipment in pre-development and post-development monitoring so that it is not considered a component of noise generated by a wind turbine.
- Post-monitoring studies require careful placement of monitors that account for the effects of topography, prevailing wind (at both ground and turbine levels).
- Post-monitoring studies must be conducted during operational conditions that generate the most noise and during seasons or times when sound propagation is likeliest (such as wintertime snow cover).
- Variances from the existing noise standards should only be granted in particular circumstances where it is clearly demonstrated that ambient preexisting noise exceeds the noise standards.
- LURC should adopt parallel rules to those of the DEP to provide more detailed guidance than LURC rules currently provide and to make standards consistent statewide.
- To ensure that shadow flicker is not an adverse impact on protected locations, applicants for windpower projects in either LURC or DEP jurisdiction should demonstrate where shadow falls will occur and to what extent shadow flicker will result. Shadow flicker should be considered in the design of any project and minimized to the extent practicable. There is sufficient statutory authority in DEP and LURC law to request and review this information.

References

National Research Council. 2007. Environmental Impacts of Wind-Energy Projects. (Washington, D.C.: National Academies Press)